

REMARKS

The Applicants would like to thank the Examiner for the quick and courteous second Office Action. The Applicants would also like to thank the Examiner for withdrawing all previous art rejections.

The Applicants greatly appreciate the indication that claims 19-31 and 33-40 are allowed over the art of record.

The Applicants further appreciate the Examiner's indication that claims 6, 10, 14, 15 and 17 were objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claim. The Examiner's attention is thus respectfully directed to the amendment to claim 5, where the recitation of claim 6 has been added thereto by amendment herein. It is thus respectfully submitted that independent claim 5 and claim 7 dependent thereon are both allowable. (Dependent claim 6 has been cancelled as redundant.)

Rejection Under 35 U.S.C. §102(b) Over Ricci, et al.

The Examiner has rejected claims 1-5, 7-9, 11, 12, 16 and 18 under 35 U.S.C. §102(a or e) as allegedly being anticipated by U.S. Pat. No. 5,164,433 to Ricci, et al.

The Examiner finds that Ricci, et al. teaches a thickener composition which may be used in drilling fluids, which comprises a latex, a surfactant, aluminum silicate and salts, such as calcium carbonate.

The Applicants must respectfully traverse.

A patent claim is anticipated, and therefore invalid, only when a single prior art reference discloses each and every limitation of the claim. *Glaxo Inc. v. Novopharm Ltd.*, 52 F.3d 1043, 1047, 34 U.S.P.Q.2d 1565 (Fed. Cir.), cert. denied, 116 S.Ct. 516 (1995).

Ricci, et al. concerns a rheological agent and thickener composition for aqueous systems that includes a mixture of clay, such as hectorite, a synthetic polymer and a starch-type material. The mixture provides efficient thickening, sag resistance, spatter resistance and stability in water-based systems, particularly in latex-based coatings. (Abstract) The aluminum silicate is added as an extender, not a precipitating agent. Ricci, et

al. does not disclose, teach or suggest the required "polymer latex capable of providing a deformable latex film on at least a portion of a subterranean formation", as recited in the claims. This recitation was already present in claim 1, and has been added to claim 8 herein. (Support is found in claim 1 as originally filed and elsewhere, and thus its inclusion in claim 8 does not constitute an improper insertion of new matter.) Because the single prior art reference does not disclose each and every limitation of the claim, the instant rejection must fail.

It is respectfully submitted that the aluminum silicate in the water-based drilling fluids of the claimed invention does not and cannot thicken the fluid. A great deal of the development of the instant invention was spent finding a latex/aluminum complex that would precipitate on the subterranean formation, but *not* in solution.

The present invention solves a very different technical problem from modifying the rheology of aqueous systems as addressed by Ricci, et al. As noted previously, the problem addressed by the instant invention is that of sealing of very low permeability subterranean formations, such as shales, where the flow of fluid into the formation is far too slow to filter out more than a few particles or create any pressure differential to hold particles against the formation if they are deposited.

Without any flow to deposit the polymer or pressure differential to hold the polymer against the formation, the plating of the particles on the formation can only be accomplished by chemical means. In the claimed invention the aluminum complex precipitates preferentially into the fluid in the shale cracks with little or no flow into the formation. The latex will then plate out of solution onto the aluminum, again with little or no flow into the formation. Since latex has a high affinity for itself, with additional circulation more latex will accumulate on the original deposit and form a latex "ball" or "mass" in the entrance to the crack. The agglomeration substantially seals the crack entrance that allows the very slow movement of pore fluid out of the crack into the formation to establish a pressure differential across the accumulated latex. This pressure differential drives the latex into the crack and fixes the latex in place.

The latex by itself will not adhere to the shale at all or at least to any effective extent. Without wishing to be limited to the details of the particular mechanism, the precipitating agent is believed to be precipitated by a reaction with the shale pore water

and forms a "primer coat" roughly similar to a paint primer (to employ an approximate, non-limiting analogy). The polymer latex then precipitates out on the "primer coat", and forms a coating analogous to latex paint. The Examiner's attention is respectfully directed to page 6, lines 17-19 of the application as filed that states: "Without being limited to a particular theory, the precipitating agent is believed to chemically bound to the surface of the clay of the borehole and provide a highly active polar surface."

Stated another way, the basic problem with all prior attempts to formulate a latex-based wellbore "paint" for low permeability formations, such as shales, is that the latex will not adhere to the shale clays. Here, the aluminum complex is used as a "primer" in the rough analogy, which first precipitates on the clay. The latex will then "wet" or "stick" to the aluminum complex. To use another rough, non-limiting analogy, the phenomenon is similar to water that beads up on a wax surface. If the wax is first coated with soap, the water will not bead, but will "wet" the surface or flow out over the surface. The invention uses an aluminum complex as a "wetting agent".

On page 3 of the Action at section 7, after kindly allowing claims 19-31 and 33-40 the Examiner stated "Applicants' arguments have been considered and are deemed *persuasive*, in that although the clays are alumino-silicate complexes, *there is no indication that such would act as a precipitating agent.*" [Emphasis added.] The Applicants would respectfully submit that this same observation may be made about Ricci, et al., *i.e.* that there is *no* indication that the aluminum silicate of Ricci, et al. would act as a precipitating agent. An important point is that the aluminum complexes are recited as *precipitating agents* in the amended claims and Ricci, et al. does not teach or describe any such precipitating agents. Ricci, et al. only teaches aluminum silicate as an extender (Table 1).

It is respectfully submitted that for all of the above reasons, the rejected claims are not anticipated by Ricci, et al. Reconsideration is respectfully requested.

Rejection Under 35 U.S.C. §102(b) Over Onan, et al.

The Examiner rejected claims 1-5, 7-9, 11, 12, 16 and 18 under 35 U.S.C. §102(b) as allegedly being anticipated by the U.S. Pat. No. 5,346,011 to Onan, et al.

The Examiner finds that Onan, et al. teaches a wellbore fluid which comprises latex, aluminum silicate, a sodium alkyl sulfate surfactant, and a salt such as zinc oxide. The Examiner further notes that the Applicants' intended use as a drilling fluid does not distinguish.

The Applicants must respectfully traverse.

A patent claim is anticipated only when a single prior art reference discloses each and every limitation of the claim. *Glaxo Inc. v. Novopharm Ltd., id.*

The Abstract of Onan, et al. shows the focus of their invention:

Improved methods of displacing a first liquid through a pipe with a second liquid while preventing the first and second liquids from mixing are provided. In accordance with the methods, a plug is formed in-situ in the pipe between the first and second liquids by injecting a self-thickening liquid therein and permitting the liquid to thicken. The formed plug and the first liquid are then displaced through the pipe with the second liquid. The methods are particularly suitable for carrying out subterranean well bore cementing operations wherein cement slurries are displaced through pipes disposed in well bores. [Emphasis added.]

Similar remarks to those made above with respect to Ricci, et al. may be made with respect to Onan, et al. here. The hydrated aluminum silicate that the Examiner points out in column 8, lines 37-61 is used to thicken the vulcanizable rubber latex composition of Onan, et al. The instant claims do not use an aluminum complex as a thickening agent – this would make the fluid too thick and keep the latex from providing a deformable latex film on the subterranean formation, as recited.

Again, the reference does not disclose a polymer latex *capable of providing a deformable latex film* on at least a portion of a subterranean formation as required by the claims. Thus, a single prior art reference does not disclose each and every limitation of the claim. Further, there is also no indication in Onan, et al. that hydrated aluminum silicate would act as a precipitating agent, which is the Examiner's reasons for allowing claims 19-31 and 32-40 over the art of record.

It is again respectfully submitted that a proper §102 anticipation rejection has not been made herein. Reconsideration is respectfully requested.

Rejection Under 35 U.S.C. §102(b) Over Endres, et al.

The Examiner has rejected claims 1-3 and 5 under 35 U.S.C. §102(b) as allegedly being anticipated by the U.S. Pat. No. 2,809,179 to Endres, et al.

The Examiner finds that Endres, et al. teaches a composition which comprises latex, barium sulphate and a precipitating agent, such as aluminum sulfate (referring to the Examples). The barium sulfate is found to contain silicate therein. The Examiner finds that the Applicants' intended use as a drilling fluid does not distinguish.

The Applicants must respectfully traverse.

Yet again, patent claim is anticipated only when a single prior art reference discloses each and every limitation of the claim. *Glaxo Inc. v. Novopharm Ltd.*, *id.*

The Endres, et al. invention relates to rubber-like compositions and is more particularly directed to a material comprising a rubber and a filler combined, and to a process for preparing the composition. The resulting composition is a powdery, free-flowing rubber-mineral composition. An explicit object of Endres, et al. is to coagulate or precipitate the latex into balls *in the solution*. Please see the following excerpts from Endres, et al.

- "An additional object of this invention is to provide a method of preparing a rubber composition by coprecipitating rubber from latex with a slurried filler in a liquid medium." Column 2, lines 42-45.
- "After the latex-filler slurry has been thoroughly mixed, coagulation can be effected by adding to the slurry of rubber latex and barytes composition the coagulant, i.e., aluminum sulfate, ..." Column 5, lines 48-51.
- "To the slurried rubber-carrier suspension about 2 pounds of aluminum sulfate were added in the form of a ½% by weight water solution. This caused coagulation of the rubber which came down with particles of mineral adhered to the particles of rubber." Column 7, lines 48-52 (Example 1).
- "This mixture was coagulated by employing a 2% solution of alum so as to provide from about 1.5 to 2% of alum by weight of rubber. The preeipitated [sic] rubber-barytes was [sic] then filtered on a rotary drum filter ..." Column 8, lines 30-34 (Example 2).

By contrast, an object of the present invention is to *avoid or prevent* any precipitation in solution, but to cause or maximize precipitation *on the subterranean formation*. Barium sulfate is an important additive in the Endres, et al. invention. If barium sulfate were present in the instant fluids, it would be crucial that the barium sulfate *not* be precipitated along with the latex as this would cause the barium sulfate to coagulate, as particularly taught by Endres, et al. This in turn would cause the barium sulfate to fall out of solution, or sag, and create a barium sulfate plug at the hole bottom that would stick the drill pipe. One of the big challenges in developing the present invention was to find a latex/aluminum complex (with optional surfactant) combination that would produce precipitation on the wellbore, but *not* coprecipitate other additives.

That is, the Endres, et al. reference still has not shown disclosed a "polymer latex capable of providing a deformable latex film on at least a portion of a subterranean formation" as required by all of the claims, as originally stated or as amended. Thus, the reference has not disclosed each and every limitation of the claims. It is respectfully submitted that the subject §102 rejection must fall. Reconsideration is respectfully requested.

It is respectfully submitted that the amendments and arguments presented above place the claims in condition for allowance. Reconsideration and allowance of the claims, as amended, are respectfully requested. The Examiner is respectfully reminded of his duty to indicate allowable subject matter. The Examiner is invited to call the Applicants' attorney at the number below for any reason, especially any reason that may help advance the prosecution.

Respectfully submitted,
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